CLAIMS:

What is claimed is:

1. A traffic management processor for scheduling packets for transmission across a network, comprising:

a departure time calculator for generating a departure time for each packet;

a departure time prioritizer for comparing the departure times with each other to determine which of the departure times is the earliest; and

a token generator for generating a token for each packet.

2. The traffic management processor of Claim 1, wherein the departure time calculator and the departure time prioritizer comprise a packet scheduler.

3. The traffic management processor of Claim 1, wherein the token generator comprises a priority encoder.

4. The traffic management processor of Claim 1, wherein the departure time prioritizer and the token generator comprise a programmable priority encoder.

5. The traffic management processor of Claim 1, wherein the departure time prioritizer comprises:

a table having a plurality of rows, each for storing the departure time for a corresponding packet; and

compare logic having a plurality of inputs coupled to corresponding rows of the table, and having a plurality of outputs coupled to corresponding inputs of the token generator.

6. The traffic management processor of Claim 5, wherein more than one row of the table stores the same departure time.

7. The traffic management processor of Claim 5, wherein each token comprises a next free address in the table.

8. The traffic management processor of Claim 7, wherein the tokens further comprise addresses for a memory that stores a payload for each corresponding packet.

9. The traffic management processor of Claim 5, wherein the departure times can be stored in any order in the table, regardless of priority.

10. The traffic management processor of Claim 5, wherein each row of the table includes a valid bit indicating whether a valid departure time is stored in the row.

11. The traffic management processor of Claim 10, wherein the tokens are generated in response to the valid bits.

12. A traffic management processor for scheduling packets for transmission across a network, comprising:

a table having a plurality of rows, each row for storing a departure time for a corresponding packet;

a compare circuit having a plurality of inputs coupled to corresponding rows of the table, the compare circuit operable to compare the departure times stored in the table with each other to determine which row stores the earliest departure time; and

a priority encoder having inputs coupled to corresponding outputs of the compare circuit.

13. The traffic management processor of Claim 12, wherein compare circuit asserts a select signal corresponding to the row

in the table that stores the earliest departure time.

14. The traffic management processor of Claim 13, wherein priority encoder generates an index of the earliest departure time in response to the asserted select signal.

15. The traffic management processor of Claim 14, wherein the index comprises a token that identifies the packet corresponding to the earliest departure time.

16. The traffic management processor of Claim 12, wherein each row of the table includes a valid bit indicating whether the row stores a valid departure time.

17. The traffic management processor of Claim 16, wherein the priority encoder generates a next free address in the table in response to the valid bits, the next free address comprising a token that identifies a corresponding packet.

18. The traffic management processor of Claim 12, further comprising a departure time calculator coupled to the table.

19. A traffic management processor for scheduling a plurality of packets for transmission across a network, comprising:

a departure time calculator for calculating a departure time for each packet;

a table including a plurality of rows, each for storing the departure time for a corresponding packet;

a compare circuit having inputs coupled to the rows of the table, the compare circuit for comparing the departure times stored in the table with each other to select the row that

contains the earliest departure time; and

a priority encoder having a plurality of inputs coupled to corresponding rows of the table, the priority encoder for generating an address of the selected row.

20. The traffic management processor of Claim 19, further comprising:

a plurality of valid bits, each indicating whether valid data is stored in a corresponding row of the table, wherein the priority encoder generates a next free address for the table in response to the valid bits.

21. A method for scheduling a plurality of packets for transmission across a network, comprising:

calculating a departure time for each packet;

comparing the departure times with each other to determine which departure time is the earliest; and

transmitting the packet corresponding to the earliest departure time.

22. The method of Claim 21, further comprising:

generating a token for each packet; and

storing each packet's departure time at a location in a table addressed by the packet's token.

23. The method of Claim 22, further comprising:

storing a payload for each packet at a location in a packet memory addressed by the packet's token.

24. A method for scheduling packets for transmission across a network, comprising:

generating a token for each packet;

calculating a departure time for each packet;

storing the departure times in rows of a table addressed by the tokens;

comparing the departure times with each other to determine which departure time is the earliest;

identifying the packet corresponding to the earliest departure time; and

transmitting the identified packet.

25. The method of Claim 24, wherein identifying the packet comprises:

asserting a signal line for the row of the table that contains the earliest departure time;

generating an index of the row having the asserted signal line; and

reading a packet from a location in a packet memory addressed by the index.

26. The method of Claim 24, wherein generating the token comprises:

generating a next free address for the table.